

Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region

| Ch  | Team or initials | General Comments Applicable Throughout Document   |
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| all | NH,TH,GJ,DS,KV   | Peer review comments would be easier to make and follow if each line in the draft was numbered.   |
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| all | NH,TH,GJ,DS,KV   | We found it very repetitive and unnecessary for the phrase “in the Western Mountains, Valleys and Coast Region” to be used throughout the document, since the regional supplement is for this area.   |
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| all | NH,TH,GJ,DS,KV   | There was concern with having to reference more than one document during wetland delineation work. It would be beneficial if each regional supplement could eventually be a stand alone document that incorporated the 87 manual where appropriate so users would only have one manual to work from. In addition, regional supplements should be formatted the same since users may work in areas that are covered by different supplements.  |
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| all | NH,TH,GJ,DS,KV   | The team feels that the supplement has many problems with clarity, which makes it difficult to follow and use. Part of the problem is that it parts appear piece meal. Team recommends that the supplement have one overall editor that focuses on organization and flow. The chapters need to have the same organizational format and main headings (as much as possible) to provide clarity and consistency between and within chapters. Suggest: Introduction, Guidance, Cautions, Procedures, and Indicators. |
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| all | NH,TH,GJ,DS,KV   | The 87 Manual needs to be cross-referenced with the supplement. There are many areas that leave the user hanging without guidance on how to proceed.  |
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| all | NH,TH,GJ,DS,KV   | A more inclusive glossary for the entire document is needed.  |
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| all | NH,TH,GJ,DS,KV   | Picture quality needs improvement. Arrows need to be added to pictures to indicate the features being discussed.  |
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| all | NH,TH,GJ,DS,KV   | The team encourages the Corps to provide training workshops.  |

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| 1  | 1  | 2   | NH,DS,GJ,KV      | Paragraph states that the supplement is an "effort to address regional wetland characteristics and improve the accuracy and efficiency of wetland-delineation procedures" and the intent is "to bring the Corps Manual up to date with current knowledge and practice in the region and not to change wetland boundaries." The last statement "not to change wetland boundaries" seems contradictory to the supplements purpose. Changing a broad methodology to regional sensitive methodologies and up-dating methods to incorporate current regional knowledge will improve documentation and accuracy. How can improving accuracy not result in some boundary changes? |
|    |    |     | NH,DS,GJ,KV      | Recommend: Change "and not to change wetland boundaries" to "and not to change the definition of wetlands or the definition of the three parameters (hydrophytic vegetation, hydric soils, and wetland hydrology) used in the identification and delineation of wetlands."   |
| 1  | 1  | 2   | NH,DS,GJ,KV      | One would conclude from the second part of this paragraph that you would go to the Corps Manual for procedures and to the Supplement for indicators. However, the Supplement also contains procedures (as stated in paragraph 4).  |
|    |    |     | NH,DS,GJ,KV      | Recommend change to: "The Corps Manual, in combination with wetland indicators and procedures provided in this supplement, can be used to identify wetlands and wetland boundaries for a number of ...."   |
| 1  | 1  | 4   | NH,DS,GJ,KV      | The paragraph on potential waters seems out of place and not germane. Recommend deleting.  |
| 1  | 6  |     | NH,DS,GJ,KV      | Table 2 comments: (1) The team did not find the table, which is a list of general characteristics, useful guidance for selection of an appropriate Regional Supplement. The general characteristics given for this regional supplement is for a large area that is highly variable and thus are not applicable over the entire area (see below for examples and recommendations). (2) Under the Climate section, Arid West average annual precipitation is given as <15 inches and the Western Mnts as >20 inches. What supplement covers 15 - 20 inches?  |
|    |    |     | NH,DS,GJ,KV      | Examples: (1) Climate - "most of the annual precipitation falls as snow, particularly at higher elevations" is not true for OR valleys or coast; (2) in the Puget Sound area of WA, Oregon ash and big leaf maple do not dominate; (3) willows can/do dominate in the higher elevations of WY, (4) not applicable to riparian areas.   |
|    |    |     | NH,DS,GJ,KV      | Recommend: (1) if all the given parameters (climate, vegetation, soils, hydrology) are used, the table needs additional work (2) add descriptive text that give guidance on how the table is to be used, (3) team believes that the driving factor is the climate (temperature & precipitation patterns) and that the table should be focuses on climate with expanded detail. Or replace the table with a paragraph on climate. (4) add figures depicting the Arid West region and the Western Mnts region.   |

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| 2  | 14 | 3     | NH,GJ,DS,KV      | Recommend: replace the word "edaphic" or define the term  |
| 2  | 14 | 4     | NH,GJ,DS         | Recommend: In the sentence, "In those cases, other indicators of hydrophytic vegetation must also be considered," insert at the end "when hydrology and hydric soil indicators are present."  |
| 2  | 15 | 1     | NH,GJ,DS,KV      | Recommend: insert after the second sentence - "This region has high seasonal climatic variability (see Section G 78(b) of the Corps Manual for guidance on Seasonal Wetlands), therefore best professional judgment should be used for conducting vegetation sampling outside the early growing season (i.e. late summer) or during periods of abnormal conditions (i.e. when snow or ice are present or during prolonged drought)."  |
| 2  | 15 | 1,2,3 | NH,GJ,DS,KV      | Overall, the team thinks the guidance on vegetation sampling is not well organized and confusing. One problem is the blending of terms and methods for "wetland determinations" and "wetland delineations." Sampling vegetation to characterize a site's heterogeneity, taking estimates within a unit as a whole, taking plot samples at representative locations within each unit, or doing point-intercept sampling to characterize a vegetation unit are all methods for wetland determination and characterization and would not result in data that helps identify a wetland boundary, which are often transitional areas.  |
| 2  |    |       | NH,GJ,DS,KV      | Comment: During our discussion, it became apparent that a lot of consultants struggle over vegetative units - what constitutes a forest unit vs. shrub/shrub unit vs. emergent and where the boundaries are between. This may not be required information for a delineation report but is required for wetland functional assessments for state and federal permits for wetland impacts and mitigation. Most consultants use the Cowardin classification (see page 11 of the "Classification of Wetlands and Deepwater Habitats of the US"). Since data collection for delineations and assessments is conducted at the same time, the team would like to see guidance and clarification on this issue. Perhaps this could be addressed in a user note section. |
| 2  | 15 | 3     | NH,GJ,DS,KV      | First sentence seems to be a way not to collect plot data. We could not think of reasons why it would be impossible to collect data. Team feels the supplement should stress the appropriate methods.   |
| 2  | 16 | 1     | NH,GJ,DS,KV      | Definition of Strata section: When defining a stratum, is the vegetation rooted within the wetland and/or data plot or does it include the vegetation overshadowing the wetland and/or data plot? It appears from our discussion that both methods are being used for determinations/delineations. This may be attributed to using the same data for multiple uses. Whereas the "rooted within" method would be more accurate for determinations/delineations, overhanging vegetation could be a important factor in characterization for a functional assessment.  |
| 2  | 16 |       | NH,GJ,DS,KV      | Rdefinition of Strata section - recommended changes: (1) insert phrase so reads, "Vegetation strata are sampled within each plot separately...."  |
| 2  | 16 |       | NH,GJ,DS,KV      | (2) insert into the 8th sentence, "Unless otherwise noted or documented using best professional judgment, a stratum..."   |
| 2  | 16 |       | NH,GJ,DS,KV      | (3) Team doesn't agree that $\geq 5\%$ total plant cover should be the cut off for a stratum. This could lead to a small number of plants in the sapling/shrub stratum or tree stratum having a disproportionate influence on the overall dominance. We feel that the herbaceous species are more representative than woodies of wetland conditions. Recommended: 20% total plant cover for a stratum (to reflect the 20% dominance parameter).   |

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| 2  | 16    |     | NH,GJ,DS,KV      | (4) Team believes it is more appropriate to list small amounts of trees/woody vines in the correct stratum and note as trace amounts instead of combining them into the sapling/shrub stratum.  |
| 2  | 16    |     | NH,GJ,DS,KV      | (5) The tree stratum should also state "and is usually $\geq 20$ ft (6 m) in height at maturity." This is taken from the Cowardin classification and would help tie in all the different definitions so that separate data does not need to be taken for the determination/delineation and the functional assessment for permit application impacts and mitigation.   |
| 2  | 16    |     | NH,GJ,DS,KV      | (6) For the sapling/shrub stratum, delete "regardless of height" and add "<3 in. (7.6 cm) DBH, and usually less than 20 ft (6 m) in height."  |
| 2  | 17    | 1   | NH,GJ,DS,KV      | The section on Snow and Ice seems out of place. Why is it only addressing snow and ice? Recommend deleting the section and inserting a sentence on page 15 paragraph 1. Perhaps appropriate season/timing for conducting delineations could be covered in an "assumptions/cautions section" that address various conditions.  |
| 2  | 17    | 4   | NH,TH,GJ, KV     | Comment: There was a lot of discussion about dropping the +/- modifiers. Initial response from many was the assumption that it would result in changes to determinations/delineations. The final general consensus was that although vegetation determinations may change, the soil and hydrology parameters still need to be met to change the wetland determination conclusion. However, one member still feels that dropping the modifiers would have a big impact and change the outcome of determinations. |
| 2  | 17    |     | NH,TH,GJ, KV     | Recommend: in a Caution Section, address that vegetation composition may change with seasons. The dominant species late in summer may not be what dominates the plant community early in spring and, therefore, affects the determination/delineation.  |
| 2  |       |     | GJ,NH            | Comment: A side topic discussed was that when a species is NOL it is assumed to be an obligate upland plant. However, in local plant guides (in Wyoming) the NOL species may be described as "found in moist places." In Oregon, others found that when designated NOL, most species are in upland. Suggestion made that this could be addressed by adding a cautionary note that BPJ based on rationale, observation, and literature could be used.  |
| 2  | 18/19 |     | NH,TH,GJ, KV     | In the Procedures section, throughout the text the phrases "dominance test" and "prevalence index" needs to be capitalized for clarity. Suggestion made that adding a flow chart would be helpful for clarification of how/what order the indicators are to be used.  |
| 2  | 19    | 4-7 | TH               | The section "Indicator 1: Dominance test" may be confusing to some as only the "Description" and "User Notes" paragraphs describe the Dominance Test. The remaining paragraphs on this page and the next are about the 50/20 Rule and how to select the dominant species.   |
| 2  | 19    | 6   | NH,TH,GJ, KV     | Last sentence change to " ...and is recommended when absolute data are available ...."  |
| 2  | 19    | 6&7 | NH,TH,GJ, KV     | On a side bar or in paragraph, define "absolute"  |
| 2  | 20    | 1&3 | NH,TH,GJ, KV     | On a side bar or in paragraph, define "absolute" and "relative"   |
| 2  | 21    | 1   | NH,TH,GJ, KV     | Recommended changes to Table 2-2: (1) need to indicated that the Percent Cover is absolute data, (2) show calculations on the 50/20 thresholds (2) Need a comment in a User Note section that the species list does not have to be listed in percent order or in the example table do not list them in percent order.   |

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| 2  | 21    | 2    | NH,TH,GJ, KV     | The paragraph for "Description" is too brief. Recommend: "A Prevalence Index of $\leq 3.0$ is considered a hydrophytic plant community.   |
| 2  | 21/22 | all  | NH,TH,GJ, KV     | General note: again clarify "absolute & relative" in Indicator 2 paragraphs   |
| 2  | 22    | last | NH,TH,GJ, KV     | Recommend changing the first sentence to read "The prevalence index can only range between 1 and 5 and to be considered hydrophytic vegetation the index has to be $\leq 3.0$ "   |
| 2  | 23    | 1    | NH,TH,GJ, KV     | Recommended changes to Table 2-3: (1) cover is absolute cover, (2) Prevalence Index is $< 3.0$ , (3) the Fraxinus was recorded in two strata (the tree and sapling/shrub).  |
| 2  | 23    | 2    | NH,TH,GJ, KV     | Indicator 3: Morphological adaptations section: Concern about how some of these feature will be interpreted. In Oregon, we see a lot of buttressing in Doug Fir trees that aren't the result of saturation. Recommend adding a "Caution" section and list some of the other reasons some of these features could be seen (i.e. disease, shallow soils, etc). Note - none of the team have seen adventitious roots in our areas. |
| 2  | 24    | 6    | NH,TH,GJ, KV     | Indicator 4: In the user notes, it description of what type of environments one should use this indicator would be helpful.   |
| 2  | 25    |      | NH,TH,GJ, KV     | Indicator 4 procedure #1: what if hummocks are not present? Is this the only place/time to use this indicator? Where should a plot be placed if there are no hummocks? Define hummocks.   |

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| 3  | 26 | 1     | NH,TH,GJ,DS,KV   | In the second sentence "Nearly all hydric soils exhibit characteristic morphologies..." suggest it is unusual not to see morphological characteristics that the indicators are based on. However, we deal a lot with soils that do not. Recommend modifying to "Generally." Also, see note on paragraph two below.  |
| 3  | 26 | 2     | NH,TH,GJ,DS,KV   | Recommend in the first sentence delete "and delineate", in order to keep consistent with the chapters on vegetation and hydrology. Indicators were given as a means for evaluation of vegetation and hydrology to delineate wetlands. The focus of the supplement and 87 Manual is on delineation of wetlands not delineation of each of the three parameters.  |
| 3  | 26 | 2     | NH,TH,GJ,DS,KV   | Some members of our team where unclear as to the statements made in sentence 2 & 3 about indicators not replacing the requirements in the definition of a hydric soil and that if a soil meets the definition it is hydric regardless of whether it exhibits indicators - especially after the statement in the 1st paragraph that "Nearly all hydric soils exhibit characteristic morphologies." Recommend: (1) It would be helpful to expand on this concept and refer the reader to the NTCHS's Hydric Soils Technical Note 1 for hydric soil terminology. (2) Explanation is partly done in other paragraphs. Recommend moving and inserting paragraph 4 into paragraph 2.  |
| 3  | 26 | new 2 | NH,TH,GJ,DS,KV   | For clarity, recommend paragraph 2 read as follows: "This chapter presents indicators that are designed to help identify hydric soils in the Western Mountains, Valleys and Coast Region. The indicators are used to help identify the hydric soil component of wetlands. The field indicators are based on soil characteristics that are documented to be associated only with hydric soils and are designed to identify soils which meet the <b>definition of a hydric soil</b> without further data collection. To use the indicators properly, a basic knowledge of soil/landscape relationship is necessary.   |
| 3  | 26 | new 3 | NH,TH,GJ,DS,KV   | For clarity, recommend insert new paragraph #3: "However, some hydric soils exist for which no field indicators have yet been recorded and documented. Therefore, the absence of any listed indicator does not preclude the soil from being hydric. Guidance for identifying hydric soils that lack indicators can be found in this chapter (see the sections on documenting the site and its soils) and in Chapter 5 (Difficult Wetland Situations in the Western Mountains, Valleys, and Coast Region). In addition, indicators are not intended to replace or relieve the requirements contained in the <b>definition of a hydric soil</b> . Therefore, a soil that meets the definition of a hydric soil is hydric whether or not it exhibits field indicators. See NTCHS Hydric Soil Technical Standard for collecting and analyzing data to determine if a soil meets the definition of a hydric soil." |
| 3  | 26 | 2     | NH,TH,GJ,DS,KV   | Suggest that sentences 4-6 ("This list of indicators is dynamic..." and "Any change...") be made into a new paragraph #4  |

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| 3  | 27 | 1   | NH,TH,GJ,DS,KV   | The team was confused by the introduction paragraph under Concepts. After the first sentence, the rest of the paragraph is out of place. Our comments and recommendations: (1) basic concept was covered in the first paragraph under Introduction on page 26. (2) changed the first sentence (since indicators are not formed) to read "Hydric soil indicators are based on features formed predominantly by..." (3) move the rest of the paragraph to the Cautions section on page 28 or distribute the information under the appropriate subtitles which follow. (4) The last 3 sentences address soils with low Fe or Mn and advises that for such soils use features formed through organic carbon accumulation. However, not all such soils have accumulation of organic carbon (i.e. sandy alluvial soils). (5) Since this is an introductory paragraph for the sections that follow, it would help the reader if the following section were presented as listed (i.e. section on iron and manganese accumulation/loss, section on sulfur, and followed by a section on carbon compounds). |
|    |    |     | NH,TH,GJ,DS,KV   | The above said, our comments and recommendations on the sections as currently given are as follows:   |
| 3  | 27 | 2   | NH,TH,GJ,DS,KV   | Recommend changing the second sentence to read "Therefore, in saturated or inundated soils, where organic matter is available, decomposing organic matter and carbon may begin to accumulate." This takes into account soils without high organic matter and differentiates organic matter from litter.   |
| 3  | 27 | 3   | NH,TH,GJ,DS,KV   | Recommend: (1) Title to paragraph 3 should be changed to "Determining the Texture of Soil Material High in Organic Carbon" since "texturing" is not a verb. (2) Would be helpful to explanation why methods for determining organic carbon content is being discussed. In the past, once a soil was determined to be an organic soil, it was considered to meet the COE indicators and determining what type of organic soil material wasn't necessary. (3) Explain and/or expand on the comment in sentence 3 that says "This method may be inconclusive with loamy or clayey textured mineral soils." This statement leads one to believe this method can only be used in silty or sandy soils.   |
| 3  | 27 | 4   | NH,TH,GJ,DS,KV   | Recommend for educational purposes changing the first sentence to read "Organic soil materials are classified as sapric (muck), hemic (mucky peat), or fibric (peat).   |
| 3  | 28 | 1   | NH,TH,GJ,DS,KV   | Table 3-2. None of our team members were familiar with this method but felt based on personal experience that this was a realistic method.  |
| 3  | 28 | 2   | NH,TH,GJ,DS,KV   | Title of section should be "Iron and Manganese Reduction, Translocation, and Accumulation" to be consistent with the first sentence in the paragraph under "Concepts" and with the indicators that include iron/manganese masses.   |

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| 3  | 28 | 2   | NH,TH,GJ,DS,KV   | Recommend expanding this section: The paragraph titled "Saturated or inundated soils" does not address "reduced matrix", "depleted matrix", or "gleyed matrix." These terms are used in the indicators and should be included in this discussion. Suggest: "In an anaerobic environment, soil microbes reduce oxidized iron and manganese after utilizing the available nitrogen. Areas in the soil where iron and manganese are present in a reduced form may develop low chroma or characteristic bluish-gray or greenish-gray colors known as <b>gley</b> and may result in a <b>reduced matrix</b> or <b>gleyed matrix</b> . Oxidized forms of iron and manganese are insoluble but the reduced forms of iron and manganese easily enter the soil solution. Once the reduced iron and manganese enters into the soil solution, it can move or translocate to other areas of the soil layer or soil profile. Localized areas that have lost iron and manganese typically develop whitish-gray or reddish-gray colors known as <b>redox depletions</b> . A horizon in which the processes of reduction and translocation have removed or translocated iron may result in a <b>depleted matrix</b> . If a soil reverts to an aerobic state |
| 3  | 28 | 3   | NH,TH,GJ,DS,KV   | Recommend expanding section on Sulfate Reduction: How many users fully understand the statement that "sulfur is one of the last elements to be reduced" and how it relates to the soil characteristics? Suggest expanding statement: "Microbes utilize the elements in the soil that provide them the most energy. That is why oxygen is the first element used, and then in the anaerobic environment, microbes will utilize nitrogen, manganese, iron, and then sulfur - in the order listed. Therefore, the reduction by microbes of each of these elements depends on the length of time the soil is saturated and the quantity of each element. If there is an ample supply of nitrogen, manganese, and iron, the microbes may never need to utilize the sulfur before the soil becomes reoxidized. If the soil is saturated or inundated for long periods and/or the soil contains small quantities of the other more beneficial elements, the microbes will reduce sulfur (SO <sub>4</sub> -2) to hydrogen sulfide (H <sub>2</sub> S), which results in a pronounced "rotten egg" odor.  |
| 3  | 28 | 4&5 | NH,TH,GJ,DS,KV   | We found the "Cautions" section to be weak. Recommend providing a more in-depth description/guidance. For a discussion on relict features, the user should be referred to the section that specifically covers this topic in Chapter 5.   |
| 3  | 29 | 1   | NH,TH,GJ,DS,KV   | Many team members felt that the first paragraph under "Observe and Document the Site" was condescending and not germane.  |
| 3  | 29 | 2   | NH,TH,GJ,DS,KV   | Recommend editing the first sentence to read "Examine the entire site and the landscape setting(s). Then at each plot location describe on the data form the plot location features listed..."  |
| 3  | 30 | 2&3 | NH,TH,GJ,DS,KV   | Under "Observe and document the Soil," the depth requirement for holes in the first and second paragraphs seems to be inconsistent. Recommend in the first paragraph after sentence 3 insert the sentence "However, the hole should be dug to a depth needed to document or confirm the absence of an indicators as described in the paragraph below."  |
| 3  | 30 | 5   | NH,TH,GJ,DS,KV   | Several members found the discussion about soil color confusing. Recommend: "Soil colors specified in the indicators do not have decimal points. If a soil color occurs between Munsell chips, the color should be recorded as seen. For example, a soil matrix with a chroma between 2 and 3 should be documented as having a chroma of 2+. However, the soil chroma should not be rounded to qualify as meeting an indicator. Therefore, a chroma of 2+ does not meet any indicator that requires a chroma of 2 or less.  |



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| 3  | 30 | 5   | NH,TH,GJ,DS,KV   | For clarity the last two sentences of this paragraph should be switched. Recommend: "Reduced iron, if present, can oxidize rapidly and create colors of higher chroma or redder hue. Therefore, examine soil colors in the field on a freshly broken ped face immediately after sampling. |
| 3  | 30 | 6   | NH,TH,GJ,DS,KV   | Recommend inserting a comment on mosaic wetlands. Suggest after the 3rd sentence insert "See the section on Wetland/Non-Wetland Mosaics in Chapter 5"   |
| 3  | 32 | 4   | NH,TH,GJ,DS,KV   | The second sentence under the section "All Soils" should be highlighted or bolded as this criteria is easily overlooked.  |
| 3  | 37 |     | NH,TH,GJ,DS,KV   | Indicator A11: Under User Notes, umbric epipedons and ochric epipedons need defined.  |
| 3  | 39 |     | NH,TH,GJ,DS,KV   | Indicator S1: bad photograph  |
| 3  | 45 |     | NH,TH,GJ,DS,KV   | Indicator F3: Under User Notes, explain the statement that "this is the most common indicator found at the boundaries of wetlands."   |
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| 3  | 50 | all | NH,TH,GJ,DS,KV   | The section on "Use of Existing Soil Data" is lost behind the Hydric Soil Indicators section. Recommend moving this section to page 31 (prior to the indicators).   |
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| 4  | 51    | 1   | NH,GJ,KV         | In the second to the last sentence, the use of the word "continuing" may suggest that the hydrology is maintained and persist without interruption. The last sentence is partially repetitive. Terms that are relative to the applicable science should be used. Recommend: "Wetland hydrology indicators provide evidence that the site has a <i>contemporary</i> wetland hydrologic regime and that hydric soils and hydrophytic vegetation are not <i>relicts</i> of a past hydrologic regime; but the indicators may provide little additional information about the timing, duration, or frequency of such events..."   |
| 4  | 51/52 | 3   | NH,GJ,KV         | This paragraph appears to be recommended procedures and a discussion about information that may be needed when hydrology indicators are absent: (more site visits; aerial photography; stream data, etc; off-site procedures developed under NFSAM; and hydrologic monitoring per Corps technical standard. Recommend: (1) Deleting this paragraph and moving the information to Chapter 5 under the hydrology section, (2) Add internet link to NRCS wetland mapping conventions , (3) If the crop-compliance slides from the USDA Farm Service Agency isn't available to the general public, reference to them should be deleted.  |
| 4  | 52    | 3   | NH,GJ,KV         | Growing Season section - Paragraph 2 states that "for convenience nationwide or in the absence of site-specific information" the Corps "recommends a procedure for estimating growing season dates" based on median dates and air temperature. Then site-specific alternative approaches are given in the next paragraph but says that the two indicators of biological activity can only be used at the discretion of the appropriate Corps district for a particular project site. It appears that the supplement is still recommending that general off-site climatic data be used over on-site conditions. The team hopes this is not true, since the median air temperature dates have proven to be inaccurate in most of our areas. What is the intent of having to get Corps approval prior to using the two indicators of biological activity? |
| 4  |       | 3   | NH,GJ,KV         | Recommended changes: (1) Move the first sentence in paragraph 3 in front of the first sentence in paragraph 1. Change the word "both" to "from" so reads, "result of biological activity from plant roots ..." (2) Reword the last two sentences (as the impracticability is not just restricted to mountainous areas and areas away from weather stations) to read: "However, this approach is often impractical when on-site data is available. Site specific data based on direct observations of biological activity during one or more site visits is the preferred approach to determine the start of the growing season in a given year."   |
| 4  | 53    | 2   | NH,GJ,KV         | In the second sentence delete "but not required". You cannot evaluate site specific soil temperature if you don't take a temperature measurement.  |

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| 4  | 53 | 3   | NH,GJ,KV         | Wetland Hydrology Indicators section recommend: (1) In fourth sentence, delete "indirect" so reads "Group C consists of evidence". Reason - be consistent - didn't call Group B indirect. (2) In sixth sentence, change to read "Group D consists of other evidence or features that indicate wet conditions". Again this is to be consistent with the title of Group D indicators, which is Evidence From Other Site Conditions or Data. "contemporary rather than historical" was deleted because ant mounds (Indicator D6) can persist after alteration of hydrology. (3) In seventh sentence, change to read "Some of the wetland hydrology indicators can be identified from one-time observations of site conditions and are sufficient evidence of wetland hydrology when in areas where hydric soils and hydrophytic vegetation are present. While other indicators may require additional observations." (4) delete the last sentence as it is irrelevant - since the indicators are in this supplement for the regions listed. |
| 4  | 53 | 4   | NH,GJ,KV         | From second sentence delete "the area is a wetland if indicators of hydric soils and hydrophytic vegetation are also present." This statement is not relative as the paragraph is about the definition of primary and secondary.   |
| 4  | 54 | 1   | NH,GJ,KV         | Last sentence leave the reader hanging. Need to add examples.  |
| 4  | 57 |     | NH,GJ,KV         | Indicator A2: Recommend change under Caution and User Notes in sentence 2 to read "The required time will vary depending upon soil texture and whether hydrology is from a groundwater or perched water table."  |
| 4  | 58 |     | NH,GJ,KV         | Indicator A3: In "General Description" paragraph insert to read "faces of soil samples (peds) removed..." for consistency  |
| 4  | 58 |     | NH,GJ,KV         | There was discussion about whether a "water table located immediately below the saturated zone" would apply to all hydrological systems. In a perched system over heavy clays, it may not seem that the water table is present because the water is held tightly in the small clay pores; in a slope seep, the area around the seep may be saturated near but not at a distance from the source.   |
|    | 58 |     | TH               | Believes need to expand on caution notes and create a dichotomous key for saturation as believes a lot of people misinterprets moist soils as saturated soils.   |
| 4  | 58 |     | NH,GJ,KV         | Comment: several members of the team were taught to test for saturation by squeezing the soil sample to release water and not by looking at glistening on the surfaces.  |
| 4  | 59 | 2   | NH,GJ,KV         | Indicator B1: in the User Notes first sentence, delete "recent" to read "When several water marks are present, the highest reflects the maximum extent of inundation." It is not always true that the highest mark is from recent events as these stains are persistent.   |
| 4  | 60 |     | NH,GJ,KV         | Indicator B2: Add arrows to the pictures to indicate the features being indicated.   |
| 4  | 61 | 1   | NH,GJ,KV         | Indicator B3: The authors have been very good about the political correctness of the guide. Please continue by replacing "man-made" references to "unnatural."   |
| 4  | 62 |     | NH,GJ,KV         | Indicator B4: The photo quality is bad, especially for figure 4-8.   |
| 4  | 64 | 2   | NH,GJ,KV         | Indicator B5: Need to add a caution about polluted (i.e. petroleum) sites.   |
| 4  | 64 |     | NH               | Comment: wetland delineation course taught that a iron film will crack when a stick is drug through, whereas, a petroleum film will not.   |
| 4  | 65 |     | GJ, NH           | Indicator B6: Believes the indicator should be secondary and not primary. In Wyoming area, have a lot of clay soils and see this type of feature all over. NH agreed this feature is not as definitive.  |

| Ch | Pg | Par | Team or Initials | Comments  |
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| 4  | 65 |     | KV               | Believes should be a primary. Caution already was given about occurring in non-wetlands. Perhaps add to the general description about sparse vegetation as the picture shows and adding a picture of a more patchy area where cracking is shown in-between clumps of vegetation.  |
| 4  | 66 |     | NH,GJ,KV         | Indicator B7: Members expressed concern about this being a primary indicator and that a conclusion can be based on one aerial photograph. Members believe there should be a requirement that the aerial signatures be ground truthed as conclusion based on surface inundation does not address the potential wetland areas that are saturated.   |
| 4  | 67 |     | NH,GJ,KV         | General: The remaining Group B indicators (and also the Group C indicators) are not in numerical sequence. They appear to be in the order given in Table4-1 on page 55, where they were grouped by category (primary/secondary). However, this is confusing and we suggest leaving the table as is but put the indicators in sequence and change the page numbers accordingly.  |
| 4  | 67 | 2   | NH,GJ,KV         | Indicator 11: Suggest adding "and/or powdery" to read "Salt crusts do not include fluffy and/or powdery salt deposits.."  |
| 4  | 67 |     | NH,GJ,KV         | Recommend replace the poor quality photograph. Member said a better picture was given in the Great Plains Supplement that could be used in this supplement.   |
| 4  | 69 |     | NH,GJ,KV         | Indicator 9: Would be helpful to have a photograph. An appropriate picture is in the Great Plains Supplement.   |
| 4  | 70 |     | NH,GJ,KV         | Indicator 8: All agreed that this should be a primary indicator not secondary. Based on field experience no one could think of a time when this was a false positive indicator.   |
| 4  | 71 | 2   | NH,GJ,KV         | Indicator 10: Recommend add "usually" to read "Drainage patterns are usually seen in areas where water flows broadly over the surface and is usually not confined to a channel..." This will keep this sentence consistent with the General Description, which states "visible on the soil surface or eroded into the soil" as "eroded into the soil" can create small, shallow channels.   |
| 4  | 72 |     | NH,TH,GJ, KV     | Group C heading needs to be changed as the word "recent" indicates late occurrence/late happening, which is not the case in all the following indicators. Suggest changing to "Evidence of Current and Recent Soil Saturation"  |
| 4  | 73 |     | TH               | Indicator C3 photograph: Cannot distinguish whether the channel/pore is coated with iron or if this is root paracarp.   |
| 4  | 74 |     | NH,TH,GJ, KV     | Indicator C4: The caution notes refer users to Problematic Hydric Soils in Chapter 5 for information on soil color changes of reduced soils when exposed to air (#4c) but refers users to NRCS Technical Note 8 for verification of ferrous iron using alpha, alpha-dipyridyl dye instead of the procedure listed in Chapter 5 (#4d). This indicator is confusing as we are not sure whether the same criteria given in Chapter 5 #4c & #4d (for layer thickness and percentage of a layer that reacts) are required here or if we are only suppose to use the color (value/chroma/hue) change information in Chapter 5. It would be helpful to provide on this page the information/criteria this indicator is based on. |
| 4  | 74 |     | NH,TH,GJ, KV     | The caution notes state that "A positive reaction to alpha,alpha-dipyridyl dye should occur over 50 percent of the soil layer in question but Chapter 5 (#4d) states that a positive reaction is at least 60 percent.   |

| Ch | Pg | Par | Team or Initials | Comments  |
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| 4  | 74 |     | KV               | Concerned that users will be applying the dye over the whole layer to determine the percentage, although the dye is not dangerous to humans unless consumed, it can be toxic to animals.  |
| 4  | 75 |     | NH,TH,GJ, KV     | Indicator C6: the photograph is not at an appropriate scale to show pore linings, which is the type of redox that the indicator is based on.  |
| 4  | 76 |     | NH,TH,GJ, KV     | Indicator C2: The title and phrase "during the summer dry season" limits this indicator and fluctuations to the normal dry season. But per the general description, "or during a drier-than-normal year," this indicator should also apply to a drier-than-normal year. Suggest deleting the above phrase and changing the title to "Dry-season and Drier-than-normal Water Tables"   |
| 4  | 76 |     | KV               | Concerned with the statement in user notes that says "For an accurate determination of the water-table level, the soil pit, auger hole, or well should not penetrate any restrictive soil layer capable of perching water near the surface." There could be situations (that have both perched and ground water driven systems) where this does not apply. If it is the dry season or drier-than-normal, a perched system may not be present at all. However, the ground water driven system may be present. If you don't dig through a shallow restrictive layer, you would not see the groundwater table. |
| 4  | 77 |     | NH,TH,GJ, KV     | Indicator C9: In the first sentence under General Description replace "show" with "indicate" since this is not a definite until field verified.   |
| 4  | 78 |     | NH,TH,GJ         | Indicator D1: Majority of team believes this should be a secondary not primary indicator.   |
| 4  |    |     | KV               | I'm on the fence with whether it should be primary or secondary. When soil indicators are present, I believe this indicator works well. When soils are a problem, it could be hard to determine if the plant stress is caused by hydrology or other factors.  |
| 4  | 79 |     | NH,TH,GJ, KV     | Indicator D2: Team is glad to see this indicator. We do recommend: (1) moving the last sentence in the User Notes to the General Description, since it is a limiting factor (2) delete the sentence "In mountain and coastal areas that receive..." as this type of situation is not limited to mountains and coastal areas.  |
| 4  | 80 |     | NH,TH,GJ, KV     | Indicator D3: Per the General Description, this indicator is limited to depressions. Why, when limiting horizons can occur on slopes to create slope wetlands?  |
| 4  | 81 |     | NH,TH,GJ, KV     | Indicator D4: (1) define "gilgai" and (2) add a caution about other factors that can cause the appearance of hummocks (i.e. cattle hooves and patty mounds).  |
| 4  | 82 |     | NH,TH,GJ, KV     | Indicator 5: Show an example  |

| Ch | Pg    | Par | Team or Initials | Comments  |
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| 5  | all   |     | NH,TH,GJ,DS,KV   | Recommend: Format of each section (vegetation, soils, hydrology) of this chapter should have the same main headings for clarity (I.e. Description of Problem, Procedures).  |
| 5  | 84    | 2   | NH,TH,GJ,DS,KV   | Recommend: (1) in the last sentence replace "personal" with "professional" to read "...interpreted in light of his or her professional experience...", (2) add a statement that additional input from an individual with specialized expertise or more extensive regional experience may sometimes be needed.   |
| 5  | 84    |     | NH,TH,GJ,DS,KV   | The formatting of the "Problematic Hydrophytic Vegetation" section makes this section very confusing. See following comments.   |
| 5  | 85    |     | NH,TH,GJ,DS,KV   | Recommend changing the heading from "Recommended Procedure" to "Procedure" to be consistent with the rest of the chapter.   |
| 5  | 85    | 2   | NH,TH,GJ,DS,KV   | The paragraph labeled number 1 is inconsistent with the formatting of paragraphs labeled 2 and 3 that has headings. This inconsistency makes this section hard to follow. Recommend either (a) folding the entire paragraph #1 into the paragraph above and renumber headings 2 & 3 to number 1 & 2, or (b) create a subheading for the paragraph labeled #1. In addition, sections 2 & 3 are referred to as "step 2" and "step 3", therefore, the subheadings should be labeled as such. |
| 5  |       | 2   | NH,TH,GJ,DS,KV   | The paragraph feels like it leaves the user hanging as it does not inform the user what to do if indicators of either hydric soil or wetland hydrology are absent due to being disturbed or problematic.  |
| 5  | 85    | 4   | NH,TH,GJ,DS,KV   | In the section 2a.1.Seasonal Shifts in Plant Communities, several members of the team felt that paragraph 1.iii should be deleted. They felt that the off-site data listed is not helpful or reliable in determining seasonal shifts in vegetation. All agreed that NWI maps and soil survey information do not address temporal shifts.  |
| 5  | 85    | 4   | TH               | In paragraph 1.iii. need examples of "remotely sensed data"   |
| 5  | 85/86 |     | NH,TH,GJ,DS,KV   | Seasonal Shifts in Plant Communities 1.iv and Extended Drought Conditions 2.ii: Team believes that a reference site approach is not realistic or practicable. In most cases, a known and documented long-term monitoring of hydrology site that matches vegetation and soils is not going to exist or be known. No information is given as to how far or close reference sites need to be.  |
| 5  | 86    | 3   | NH,TH,GJ,DS,KV   | 2.b Sparse and Patchy Vegetation: (1) This paragraph contains statements but gives no procedures. Back in the paragraph labeled #1 on page 84, one is told to "follow the suggested steps" under step 2 and 3. (2) Need to address scale in the type of situation shown in the Figure 5-1 - what is the smallest size you map out the vegetated/unvegetated areas? (3) For Figure 5-1, the figure text needs to indicate the unvegetated areas may be other waters.                       |

| Ch | Pg       | Par | Team or Initials | Comments   |
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| 5  | 87       | 1   | NH,TH,GJ,DS,KV   | 2c. Riparian Areas: (1) Recommend the first sentence be expanded to make it clear that riparian ecosystems can contain wetland and non-wetland components, which would clarify what the rest of the paragraph addresses. (2) The paragraph contains statements but gives no procedures.(3) Some statements in this paragraph (such as: "soils may lack hydric soil indicators in recently deposited materials" and "if the soils are Entisols, lacking hydric soil features and/or wetland hydrology is problematic") may be confusing since back in the paragraph labeled #1 on page 85, one is told "If indicators are present, proceed to step 2 or step 3 and follow the suggested steps." Therefore, if the site had the above problematic conditions, one would not be reading this section. Recommend that the Paragraph labeled 1 on page 85 be rewritten. (4) Define "phreatophytic". |
| 5  | 88       |     | TH               | 2e. Managed Plant Communities: Recommend add a procedure that advises the user to discuss site management with the property owner. There are situations in California where managed lands go from nonnative to native and the reverse.   |
| 5  | 88/89/91 |     | NH,TH,GJ,DS,KV   | 2d.1, 2e.1., 2f.1, 2g.1, and 3.b.: Team member believes that reference site approach is not a reliable method for conducting wetland delineations and is not realistic or practicable. In most cases, a known and documented long-term monitoring of hydrology site that matches vegetation and soils is not going to exist or be known. No guidance is given as to how far or close reference sites need to be or when and how to use a reference wetland.  |
| 5  | 89       |     | NH,TH,GJ,DS,KV   | 2g.2: For off-site information, remove "NWI maps" as they do not provide adequate vegetation information.  |
| 5  | 90       | 1   | NH,TH,GJ,DS,KV   | The following sentences are confusing: "In relatively frost-free areas, such as near the Pacific coast, early-season germination of FACU and UPL species occurs in some wetlands (e.g., vernal pools) prior to the onset of seasonal hydrology. These plants may persist and dominate in wetlands during the normal wet season." The normal wet season for this region is late fall, winter, and spring. So, "prior to the onset of seasonal hydrology" would be late fall or early winter - is this early-season germination?   |
| 5  | 91       | 4   | NH,TH,GJ,DS,KV   | Soils with Faint or No Indicators: Recommend deleting the sentences "In some cases, these...." and "In other, the..." and "In addition, recently..." as these sentences are giving examples. Need to move them to the list of examples that follows and expand on the explanation.   |
| 5  | 92       |     | NH,TH,GJ,DS,KV   | Moderately to Very Strongly Alkaline Soils: to make the paragraph consistent (the terms Mn and Fe is sometimes used and other times only Fe) the second sentence should be changed to "The formation of redox concentrations and depletions requires that soluble manganese, soluble iron, and organic matter be present in the soil. In a neutral to acidic soil, manganese and iron readily ...."  |

| Ch | Pg    | Par | Team or Initials | Comments  |
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| 5  | 93    | 1   | NH,TH,GJ,DS,KV   | Soils with Relict Hydric Soil Indicators. Recommend: (1) This paragraph should be moved and placed at the end of the "Procedure" section on page 95 as the "Procedure" section pertains to soils with no indicators and not relict soils. (2) The title should be "Soils with Relict Hydric Soil Features" as soils exhibit "features" not "indicators". (3) The first sentence needs changed to read "...exhibit redoximorphic features that formed in the recent or distant past...". since it is features not indicators that form in soils (4) Need to define the difference between "relict hydric soil features" and "historic hydric soil features". (5) In the last sentence, change "indicators" to "features" so the sentence reads "...then hydric soil features can be assumed to be contemporary." (6) May want to refer the reader to the NTCH's Technical Note 13 that discusses artificial, drained, historic, and relict hydric soils. |
| 5  | 93    | 2   | NH,TH,GJ,DS,KV   | Recommend: (1) italicizing the sentence "This procedure should be used only where indicators of hydrophytic vegetation and wetland hydrology are present but indicators of hydric soil are not evident." It would probably be helpful to italicize similar statements throughout the supplement. It helps reinforce that the procedures still depend on a three parameter approach unless the parameters are disturbed or problematic. (2) That said, the word "only" should be deleted from the sentence. As the next sentence allows further use by stating, "Use caution in areas where vegetation and hydrology are also problematic".  |
| 5  | 93    | `   | NH,TH,GJ,DS,KV   | The "procedures" labeled 1 through 4 should be relabeled as "Step 1 through Step 4" since that is the way they are referred to within each procedure.   |
| 5  | 93    | 2   | NH,TH,GJ,DS,KV   | Procedure #2: Recommend changing the second sentence to, "If indicators of hydrophytic vegetation and/or wetland hydrology are absent, and the vegetation and hydrology are not problematic, then the area..."  |
| 5  | 93    | 2   | NH,TH,GJ,DS,KV   | Procedure #3: (1) The way this paragraph is worded, seep wetlands would not be identified (2) expand on example (f) to remind users that restrictive layers can occur on slopes.  |
| 5  | 94    |     | NH,TH,GJ,DS,KV   | Procedure #4b: Recommend inserting that this applies only where indicators of hydrophytic vegetation and wetland hydrology are present.   |
| 5  | 94/95 | 2   | NH,TH,GJ,DS,KV   | Procedure #4c&d: The team does not understand why the two procedure for determining the presence of reduced iron was not made into Hydric Soil Indicators for Problem Soils and added to the indicators on page 49. These procedures do show up as a hydrology indicator C4 on page 74.   |
| 5  | 94    |     | NH,TH,GJ,DS,KV   | Figure 5-3 photograph has bad overall color tone reduced feature not identifiable.  |
| 5  | 95    | 3   | NH,TH,GJ,DS,KV   | Recommend including a caution note about high pH by changing the fourth sentence to "A positive reaction will not occur in soils that lack iron and may not occur in soils with high pH."   |
| 5  | 95    | 4   | KV               | Paragraph 4e. (1) question about the statement "determine whether a soil is ponded or flooded, or the water table is $\leq$ 12 in (30cm) from the surface, for $\geq$ 14 consecutive days during the growing season..." - does this mean the Hydric Soil Criteria (criteria 3 & 4) that can be used as indicators for identification of hydric soils, according to the NTCHS, that are frequently ponded or flooded for long duration (single event ranging from 7 days to 1 month) can not be used any longer? This needs clarified.   |
| 5  | 96    |     | NH,TH,GJ,DS,KV   | Recommend that the section titled "Wetlands that Periodically Lack Indicators of Wetland Hydrology" be changed to "Problematic Wetland Hydrology" so that it is consistent with the section titles in the chapter.  |



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| Ch | Pg    | Par | Team or Initials | Comments   |
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| 5  | 96    | 4   | NH,TH,GJ,DS,KV   | Paragraph 2 under "Procedure": This procedure is almost exactly the same as Procedure 3 in the soils section. However, they are formatted differently and different terminology (geomorphic position vs. landscape setting) used. Consistency needs to be maintained in order to achieve clarity and make the supplement user friendly.  |
| 5  | 97    | 3   | NH,TH,GJ,DS,KV   | Paragraph 3b. Periods with below normal rainfall: Recommend changing "mountainous" to "the region" to read "In the region, average precipitation amounts can vary considerably over short distances" as this applies over the entire region.   |
| 5  | 98/99 | 4   | NH,TH,GJ,DS,KV   | Paragraph 3e: (1) see the teams previous comments on the use of reference sites. (2) The last sentence of this paragraph states that reference site documentation should be kept on file in the District or field office. Does this refer to the CORPS offices? Does the CORPS currently have available a list of wetland reference areas and their documentation?   |
| 5  | 99    |     | NH,TH,GJ,DS,KV   | Paragraph 3g. Evaluating multiple years of aerial photography: (1) In reference to the first sentence of the first paragraph, are the aerals from FSA available to the general public? From team member's experience, FSA does not share their records due to confidentiality. If these aerals are not available, then this information is not relevant. (2) The last sentence of the second paragraph states the "data forms for documenting the wetland hydrology determination are given in section 650.1903...", which leads one to believe they should use the forms. |
| 5  | 100   | 2   | NH,TH,GJ,DS,KV   | 3h.Long-term hydrologic monitoring: Recommend changing the first sentence to read "On sites where the hydrology has been artificially manipulated (e.g. with ....".  |

| Chapter   | Pg      | Team or initials | Comments   |
|---|---------|------------------|--|
| Appendix A: Glossary  | 107-111 | NH,DS,GJ,KV      | A more inclusive glossary is needed.   |
| Appendix B: Point-Intercept Sampling Procedure for Determining Hydrophytic Vegetation | 112-113 | NH,DS,GJ,KV      | The method has a very limited application since it cannot be used for a wetland delineation and is too detailed for a wetland determination. Method is sometimes used in monitoring or rare plant surveys.   |
| Appendix C: Data Form   | 114     | NH,DS,GJ,KV      | Soil Profile Description section: (1) under "Redox Features," add a column for "contrast" (2) "RM-Reduced Matrix" may lead to confusion - do you put the reduced/depleted soil matrix color under "Matrix" or under "Redox Features" and leave the "Matrix" blank? (3) For "Redox Features", add "Ped Faces" and "Other" to the "Location" choices. Since the supplement requires more detailed soil profile description, all generalized redox locations should be included in order for the user to document correctly what they are seeing. By adding "Other," such things as "around rock fragments" could be documented as suggested in the Problematic Hydric Soils section on "Vegetated Sand and Gravel Bars within Floodplains."  |
|   | 114     | NH,DS,GJ,KV      | Hydric Soil Indicators and Indicators for Problematic Hydric Soils section: (1) As recommended in Chapter 5, procedures 4c and 4d that deal with reduced soils should be problem soil "indicators" and added to the list under "Indicators for Problematic Hydric Soils." (2) this section limits documentation to a soil plot that meets one of the NTCHS indicators or a plot that has vegetation and hydrology indicators that meets one of the two problematic indicators. There are no "Other" indicators provided in the supplement there are "procedures" given for documenting problem soils. Recommend adding another area to this section that indicates that the procedures were used when no indicators were met. The section could be titled "Other Problematic Hydric Soils***" with a list that includes "Meets the Hydric Soil Definition, "Problematic soil situation," and "Other". **Explain in Remarks. By adding this section, it would reaffirm that not all hydric soils have hydric soil indicators and provide an area to document that the problematic procedures were used. |